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Many instances of the multiplication of parts in the different whorls of a flower have been recorded. This takes place in different ways, and one or more whorls may be affected. In the present case there seems to be a union of two flowers, making a duplication of each whorl, or polyphyllly of the calyx, the andrœcium and the gynœcium. The undulation-like teeth of the margin of the calyx are increased from four to eight, the stamens from eight to sixteen and the pistil from one to two. The change occurs in all the flowers on the specimen and modifies the shape of the calyx from "tubular-funnelform" to campanulate.

JOHN K. SMALL.

### Reviews.

*Systematische Phylogenie der Protisten und Pflanzen.* Ernst Haeckel. 1st Portion. Berlin. 1894.

As the author states in his preface, he has been engaged for the past thirty years upon questions pertaining to the subject-matter of this volume. All are acquainted with the "History of Creation" and have enjoyed its generalizations, and the present volume offers a rare treat to those who would advance a step and enter into generalizations based upon more specific and detailed data.

He opens with a chapter upon Phylogenie, defining it, and giving Paleontology, Ontogeny and Morphology as the sources for the working-out of the problems. He rapidly and skillfully sums up the positive and negative in the geological record; discusses the value of Ontogeny and outlines the principles of Morphology. A brief review of the methods is followed by a summary of the geological systems and the first chapter, including thirty-two pages, closes with a critical review of the monophyletic and polyphyletic theories of Phylogeny.

The second chapter, fifty pages, deals with the phylogeny of the Protista, where the beginnings of life are taken up. Mr. Haeckel's familiar Monera, "Structureless organisms without organs," again does service as a starting point from which the Protista arise, in which class he groups all those organisms "which

do not build tissues;" calling those of a solitary turn of mind "Monobionten" and the more social "Coenobionten." Following the definition of the Protista, a paragraph or two is devoted to the differences in the plant and animal kingdoms. Here much stress is laid upon the synthetic character of the one and the analytic character of the other class of organisms. The plants are rechristened "Plasmodomen" and the animals "Plasmophagen" or plasma builders and plasma destroyers.

The Protista are then divided into three main groups, the atypical Protista; the plant type protista or Protophyta and the animal type protista or the Protozoa. In the first of these are included those organisms that show no particular affinity to either group, on account of an indifferent growth or because they may be at times either animal or vegetable in their functions, and are to be divided purely upon artificial grounds according to what seems to the author to be the predominant physiological activity. We note that the botanists gain the Peridineae and the zoölogists the Bacteria, which latter are said to be lacking a nucleus which, if we are not sadly mistaken, is somewhat "behind the times."

The typical Protophyta include those organisms in which

1. The cell-wall is surrounded by a special membrane which is entirely closed or has only a few openings; this membrane consisting of cellulose.
2. The cell-body is either entirely motionless throughout its life history, or, at rare intervals and in small degrees, moves about by means of flagellae, as in the swarm spores.
3. The cell is always colored, generally green or gold, and contains chromoplasts which generally contain chlorophyll, also at times diatomin, haemochromatin, etc.
4. The metabolism is entirely vegetable; the cell is "plasmodomen" and assimilates  $\text{CO}_2$ ; it takes up no formed organic matter and possesses no mouth opening.

In this group are included (1) Algarien, (2) Algetten.

The pages following are too solid for abstracting, but are of interest with much philosophic thought; the phylogeny of the soul of the Protista forming an interesting extravaganza on pages 75, 76. The third chapter deals with the systematic phylogeny of the Protophyta; in this the starting point is with those atypical Pro-

tista that have a "vegetable tendency." Those without a cell nucleus, including many of the Cyanophyceae, under the name of Chromaceae begin the family tree. We can give here only the main lines of ascent, as the work is an abstract itself, and to further abstract it would out-Herod Herod. Through the Chromaceae the Algariae are reached in *Palmella*, from which Diatoms and Desmids diverge and represent radiating extremes of development in their respective lines. The Algetten, the second main class, includes many forms hitherto reckoned under the care of the zoölogists; many of the flagellate infusoria for instance. It includes all those single cell forms that have zoospores and flagellae movements: *Euglena*, *Protococcus*, *Peridinium*, *Volvox*, *Botrydium* and *Caulerpa* are included in order.

The fourth chapter treats of the Protozoa, already reviewed by the zoölogists in "Science."

The fifth chapter takes up the *general* morphology of the Metaphytes or those plants which are many-celled and tissue builders, including (a) Thallophyta, (b) Diaphyta, (c) Anthophyta. This chapter we consider the finest in the book and can be read by all botanists to some advantage independent of their interests, morphological, systematic or physiological. Chapters six, seven and eight take up the three classes respectively. The Thallophytes ascending through the Chlorophyceae, Protococcus to Confervales and branching in several directions; the Florideae, the highest branch, through *Bangia*; *Fucus*, through *Ectocarpus* and *Laminaria*. The Characeae a special branch through *Nitella*. The Ulvaceae to the form similar to *Riccia* and from them to chapter seven on the Diaphytes. Among the Thallophytes the fungi are represented as an offshoot from the Chlorophyceae, which is hardly tenable after Professor Farlow's well-founded suggestions upon this group, and the lichens are regarded in the Schwendenerian sense.

The Diaphytes include the Hepatics and Mosses. These are made to arise through a primitive *Riccia*, from thence through *Pellia* to the foliose forms and to *Haplomitrium* when a true axis is first reached and from this, through Sphagnums and Andreaceae or their common ancestor to the true mosses. Marchantiales and Anthoceratales are made blind alleys of growth.

The Pteridophyta are made to rise from the same ancestral Riccia-like form as the "Diaphytes," to a hypothetical "Archipterides," thence through the Hymenophyllaceae, when the stem divides into three lines, the Filices, the Equisetaceae and Lycopodiaceae, which last make the way for the Anthophyta.

These, in the closing chapter, through the Cycads and some forms similar to the fossil Noeggerathia split into a forest of stems. The Gymnosperms representing a growth through the Araucariaceae, while through some forms resembling the Australian "Casaurineae" the Angiosperms were developed.

The critic would need to be a specialist in many branches, and could write a book equalling, in size, the original, if all of the interesting points touched upon were to be discussed, but to give an opinion of the work in a word, we can heartily say that a good and mighty work has been accomplished.

Upon points of classification varying points of view must always be borne in mind. Possibly the author has made a mistake in a fundamental point, upon which he devotes much space and thought to elucidate for having cautioned others not to confound Homology, form : with Analogy, function : he deliberately makes his most sweeping classes and distinctions upon a purely physiological, hence functional basis.

The numerous points of difference which would interest workers in special fields can not be discussed here, but the work is to be recommended to all readers as one of more than common interest.

SMITH ELY JELLIFFE.

Volume I., of Anton Kerner von Marilaun's *Pflanzenleben*, translated by Prof. F. W. Oliver as *The Natural History of Plants*, has recently been issued from the press of Henry Holt & Co. This work will be warmly received by all lovers of nature. In a style simple, attractive and still thoroughly scientific, Professor von Marilaun considers in this first volume: The Living Principle in Plants, Absorption of Nutriment, Conduction of Food, Formation of Organic Matter from the Absorbed Inorganic Food, Metabolism and Transport of Materials, Growth and Construction of Plants and Plant-forms as Completed Structures.

Under there captions are discussed in a most charming man-

ner hundreds of interesting biological questions that have been practically excluded from the attention of very many people through the technicality of authors. Now, indeed, for the first time, are thrown open wide the gates to the natural history of plants and all may enter and enjoy the wide range of the whole field. The above mentioned seemingly unattractive subjects are invested with a charm that must arouse the enthusiasm of all. Thus under the rather unattractive title of Absorption of Nutrimment, is discussed, among many other subjects, the adjustment of leaves to the welfare of the root; plants with traps and pitfalls to ensnare animals. So also under conduction of food a chapter is given to all those wonderful adaptations whereby the plant may suffer no inconvenience from untoward external conditions that would interfere in any way with its life current; and then again are taken up those adjustments of branches and that exquisite moulding of leaf forms and their relation to the branches whereby the best interests of the plant are subserved, and in this connection follows a discussion of the protection of leaves against the attacks of animals. The work is in a sense exhaustive, copiously illustrated, the wood engravings especially being excellent, and the translator reflects most happily the spirit of the author.

C. C. CURTIS.

*The London Catalogue of British Plants.* The recent publication of the ninth edition of the list of higher plants growing naturally in Great Britain and Ireland (the Characeae are appended), affords opportunity for ascertaining just how widely British botanists differ from our recently issued "List of Pteridophytes and Spermatophytes" in the nomenclature of genera. From the statements of some writers one might be lead to infer that the disagreements would be very numerous, but it appears that this is not the case.

The total number of genera listed in the English publication, exclusive of the Characeae, is 538. The "List of Pteridophyta and Spermatophyta growing without cultivation in eastern North America" contains 970. Allowing for differences in generic limitations, the London Catalogue sometimes uniting genera which the "Check-list" holds distinct, and *vice versa*, there are about

440 genera in common, all but 18 of which bear the same names. I have indicated these in the following table:

CHECK-LIST.	LONDON CATALOGUE.
<i>Capnoides</i> Adans. 1763.	<i>Neckeria</i> Scop. 1777 (1).
<i>Roripa</i> Scop. 1760.	<i>Nasturtium</i> L. 1735 (2).
<i>Alsine</i> L. 1753.	<i>Stellaria</i> L. (3).
<i>Tissa</i> Adans. 1763.	<i>Buda</i> Adans. 1763 (4).
<i>Spiesia</i> Neck. 1790.	<i>Oxytropis</i> DC. 1802 (5).
<i>Sanguisorba</i> L. 1753.	<i>Poterium</i> L. (6).
<i>Silybum</i> Gaertn. 1788.	<i>Mariana</i> Hill, 1762 (7).
<i>Legouzia</i> Durand, 1782.	<i>Specularia</i> Heist. 1748 (8).
<i>Limonium</i> Adans. 1763.	<i>Statice</i> L. (9).
<i>Statice</i> L. 1753.	<i>Armeria</i> L. (10).
<i>Udora</i> Nutt. 1818.	<i>Elodea</i> Michx. 1803 (11).
<i>Leptorchis</i> Thouars, 1808.	<i>Liparis</i> L. C. Richard, 1818 (12).
<i>Gyrostachys</i> Pers. 1807.	<i>Spiranthes</i> L. C. Richard, 1818 (13).
<i>Peranium</i> Salisb. 1812.	<i>Goodyera</i> R. Br. 1813 (14).
<i>Juncoides</i> Adans. 1763.	<i>Luzula</i> DC. 1805 (15).
<i>Savastana</i> Schrank, 1789.	<i>Hierochloë</i> S. G. Gmelin, 1747. (16).
<i>Panicularia</i> Fabric. 1763.	<i>Glyccria</i> R. Br. 1810 (17).
<i>Dryopteris</i> Adans. 1763.	<i>Polystichum</i> Roth, 1794 (18).

## NOTES.

1. Both lists thus reject *Corydalis* Vent. 1803. While the British botanists were taking up another name, it seems strange that they could not accept *Capnoides*, which is quite as well defined as any of the rest of Adanson's genera, and of these they have admitted a considerable number: *Meum*, *Arctostaphylos*, *Cicendia*, *Epipactis*, *Polygonatum*, *Mibora*, *Apera*, for example.

2. The Linnaean use of *Nasturtium* is confined to the first edition of his "Systema," published in 1735. He did not use it subsequently and it was only again taken up by R. Brown in 1812. Meanwhile *Roripa* had been published and well defined. The American rejection of *Nasturtium* is thus based on the Rochester agreement, adopted by the Genoa congress, and more recently approved by the Austro-German botanists, to begin generic nomenclature at 1753.

3. Here, again the "starting-point" for generic names comes into consideration, and *Alsine* has precedence of place in the first edition of the "Species Plantarum," both genera being recognized in that work. It appears possible to me that both genera will again be recognized, *Alsine* for *A. media* and its relatives and *Stellaria* for such types as *S. graminea*.

4. Both lists thus reject *Spergularia* Presl, and *Lepigonum* Wahl. *Tissa* has

precedence of place in Adanson's "Familles des Plantes" and is accepted by Baillon in his "Histoire" and by Pax in Engler-Prantl's "Natürliche Pflanzenfamilien."

5. Necker's name for this genus is satisfactorily identified by the description; I have been unable to discover any reason under any set of principles which really warrants its rejection. The authors of the London Catalogue have admitted *Boretta* proposed by him. Why not *Spiesia*?

6. *Poterium* L. is considered, and in my opinion correctly, by European authors, as monotypic, including only *P. spinosum* L. of southern Europe.

7. This is a case in which the London Catalogue is right, and the American list wrong, under all rules, and we should be grateful for the correction. The citations are MARIANA Hill, Veg. Syst. 4: 19. 1762. *Mariana Marianum* (L.) Hill, Hort. Kew. 61. 1769. Hill's use of duplicate binomials is the earliest which has come to my attention; he proposed a number of others in the same publication.

8. *Specularia* Heist. was taken up by no subsequent author until employed by Alphonse DeCandolle in 1830. The 1753 "starting point" excludes it. Meanwhile *Legouzia* had been published and the genus defined.

9-10. In adopting *Statice* L. for *S. Armeria* L. and its allies, and *Limonium* Adans. for *Statice Limonium* and its congeners, the American list returns to the use of *Statice* in the "Species Plantarum" of 1753, in which the genus *Armeria* was not taken up. The use of these generic names, as adopted in the London Catalogue, dates only from their publication by Willdenow, 1809.

11. *Elodea* was regarded by the American committee as a homonym of *Elodes* Adans. 1763. I have recently discussed this point (Science, n. s., 2: 5. 1895), showing that *Philotria* Raf., has a few months' priority over *Udora*. It will be noted that both lists reject *Anacharis*.

12. The validity of publication of Du Petit Thouars' genera of Orchidaceae has been questioned, but also ably defended. I have not had access to his paper.

13. There can be no doubt as to Persoon's intention in proposing the name *Gyrostachys* (*Gyrostachis* in original), as he refers to *Ophrys spiralis* L., to illustrate it; this species is included in *Spiranthes* by recent authors.

14. There can be no possibility of mistaking Salisbury's meaning in the publication of *Peranium*, for he bases it on one of the same species cited by R. Brown under *Goodyera* a year later. It is true that Salisbury published no description of the the genus; but many other widely accepted genera rest on just this form of publication.

15. My remarks under *Capnoides* apply equally well to this. Perhaps the compilers of the London Catalogue objected to the termination *oides*, but they have good authority for its use in the publication by Benth and Hooker (Genera, 2: 301) of *Mniodes* A. Gray, and this is also accepted in the Kew Index.

16. Gmelin's name antedates the first edition of "Species Plantarum" and was not again used until after the publication of *Savastana*.

17. I have not seen the original publication of Fabricius, but *Fanicularia* and *Glyceria* are cited as equivalent by Kuntze.

18. Both lists thus reject *Aspidium* Sw. 1800. It should be added that the London Catalogue recognizes *Polystichum* Roth, and *Lastraea* Presl, as genera.

The percentage of difference in the two lists is 4.09 per cent.



The changes of generic names in the ninth edition of the London Catalogue, from those used in the eighth edition, published in 1886, and which agree with the American catalogue, are as follows:

*Nymphaea* L., 1753, for *Nuphar* Sibth. & Smith, 1808.

*Custalia* Salisb., 1805, for *Nymphaea* J. E. Smith, 1806.

*Bursa* Weber, 1780, for *Capsella* Medic., 1792.

*Coronopus* Gaertn., 1791, for *Senebiera* DC., 1799.

*Schollera* Roth, 1788, for *Oxycoccus* Pers., 1805.

*Pneumaria* Hill, 1762, for *Mertensia* Roth, 1797.\*

*Homalocenchrus* Mieg., 1768, for *Leersia* Sw., 1788.

*Weingaertneria* Bernh., 1800, for *Corynephorus* Beauv., 1812.

*Sieglingia* Bernh., 1800, for *Triodia* Beauv., 1812.

It would appear, from a consideration of these comparisons, that the British botanists were, after all that has been said, gradually coming to recognize the validity of the principle of priority, in at least generic nomenclature. There also appears to be no good reason why this process should not continue, so that by the time of the issue of the tenth edition of their useful list the percentage of difference might be reduced to 2 per cent. or perhaps less.

For, if the recognition of this principle had been complete, and the 1753 "starting-point" had been accepted, not more than six of the genera would have borne different names. N. L. B.

*Among Rhode Island Wild Flowers.* By W. Whitman Bailey. Providence, R. I. Preston and Rounds. 1895. Cloth. 16 mo. pp. 105.

Under the above title, Prof. Bailey has grouped a number of chapters which we may well designate as bits of floral poetry, written in prose. The author does not attempt to give a list of Rhode Island plants, but to call attention to the fact that the flowers of the State are of surpassing beauty and interest. Rhode Island lies on the line dividing our northern and southern floras, and hence contains many interesting forms.

After an introduction, we have a scheme of plant distribution, showing the wide variation of plant life, in plants of the salt water, the salt marsh, the river, the sea beach, the bog, the forest and the

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\* The American publication maintains *Pneumaria* and *Mertensia* as distinct genera.

like. Nearly half the book is taken up with a description of the Favored Spots, and this constitutes the chief charm. A few choice plants are mentioned in each case, while a delightful picture of the locality is presented, enticing the botanist to visit the spot and search for the treasures growing there. Especially interesting is the chapter on Wild Flowers of Block Island, where the presence or the absence of certain forms is suggestive of speculation as to the distribution of plants. The weeds of the State claim a separate discussion. Interesting to a botanist they are, as Prof. Bailey says, "A flower garden is lovely ; but for vital, everyday, continual interest, a weed-grown yard is far-and-away more fascinating."

A list of Rhode Island trees is appended. We welcome the little book, for it cannot fail to fill its readers with a love for our wild flowers in general.

WALTER DEANE.

### Proceedings of the Botanical Club, A. A. A. S., Springfield Meeting, August 29th to September 2d, 1895.

The meetings were held in the room assigned to Section "G," in the State Street Baptist Church.

#### THURSDAY MORNING, AUGUST 29TH.

In the absence of the President, Prof. D. H. Campbell, and of the Secretary, Prof. F. C. Newcombe, the meetings of the Club were placed in organization by Prof. Geo. F. Atkinson. Hon. David F. Day was made Chairman pro tem. and Prof. H. L. Bolley, Secretary.

On motion of Professor Atkinson, those having papers to present were requested to hand titles of the same to the Secretary upon the day preceding that upon which it was wished the paper should be read.

The meeting adjourned at 11:30 to meet at 9 A. M., Friday, August 30th.

#### FRIDAY MORNING, AUGUST 30TH.

The Club met as ordered, with President D. H. Campbell in the chair. In order to facilitate the reading of papers, the titles of